

Copyright is owned by the Author of the thesis. Permission is given for a copy to be downloaded by an individual for the purpose of research and private study only. The thesis may not be reproduced elsewhere without the permission of the Author.

AN INVESTIGATION INTO THE USE OF QUALITY MANAGEMENT TECHNIQUES IN NZ IT PROJECTS

A thesis presented in partial fulfilment of the
requirement for the degree of

MASTER OF SCIENCE

in Information Systems
at Massey University, Albany campus, New Zealand

RuiLin (lynn) Xu
2006

ACKNOWLEDGEMENTS

I would like to thank my project supervisor, Mr Dave Wilton, for his guidance throughout the whole one and half years.

I am also grateful to my colleagues, Ramesh Lal, your patience and support throughout the whole year. Thank you for all the books and other information you collected for me to finish my thesis.

Thank Chris Stodart and Sam Alexandra, without you check all my grammar, nobody can understand what am I talking about.

Thanks to my family for your support all the way through my life, even if you did not really understand what it was all about. Thanks heaps for the encouragement and concern.

ABSTRACT

The risks in an IT project are very high both because of its complexity and also because the context of rapidly-developing technology leads to a high degree of uncertainty. IT projects should have comprehensive formal quality management fully integrated within all aspects of project management.

A review of the quality management in IT project literature suggests, customer-focused TQM is now synonymous with good management. TQM combines the use of computerised data collection and statistical experimentation with a focus on teamwork, group participation and a culture of continuous improvement in operating systems (Robert, 1993).

Using the survey methodology and through two case studies, qualitative data was gathered to develop a model of quality management implementation process in New Zealand.

Key words: Quality, Total Quality Management (TQM), Quality Control (QC), Quality Assurance (QA), Quality Model.

Table of Contents

LIST OF TABLES.....	3
LIST OF FIGURES.....	5
INTRODUCTION	6
Scope of Quality	7
Product Quality	9
Process Quality	10
Product Quality vs. Process Quality	11
IT Project Basic Concepts.....	12
IT Project Management.....	12
IT Project Quality	14
Quality Management (QM).....	16
Expected Results.....	18
Research Questions.....	19
LITERATURE REVIEW	20
Development of Quality Management.....	20
Quality Assurance (QA)	21
Quality Control (QC).....	22
Total Quality Management (TQM).....	22
QC vs. QA vs. TQM	24
TQM Main Elements	26
<i>Customer Focus</i>	27
<i>Continuous Improvement (CI)</i>	31
<i>Process Control</i>	33
<i>Quality Training</i>	36
<i>Employee Empowerment</i>	37
<i>Top Management Commitment (Leadership)</i>	39
<i>The Management of Culture</i>	40
<i>Information System Usage</i>	43
<i>Cost of Quality (COQ)</i>	44
<i>Quality Management Models</i>	46
CMM.....	49
ISO Standards	49
TQM vs. ISO 9000.....	51
Malcolm Baldrige Awards.....	52
Other Quality Models	53
State of TQM	54
TQM in New Zealand	56
<i>The Implications of National Politics</i>	57
Barriers to Quality Programme Success	58
General Lessons on the Process of Establishing TQM.....	61
METHODOLOGY	63
Survey	63
Case Study (RQ 4)	70
RESULTS FROM SURVEY	72
Discussion of results from survey.....	72
<i>The State of Quality Plan</i>	75
<i>The Decision to Change</i>	77
<i>Planning the Quality Programme for the IT Project</i>	83

<i>Effects of Change</i>	86
Hypothesis Tests	93
CONCLUSIONS	100
Research Question 1	100
Research Question 2	106
<i>Recommendations for Improvement</i>	109
Research Question 3	110
Research Question 4	111
<i>NZ Police Integrated National Crime Information System (INCIS) Project</i>	111
<i>Summary of interviews key findings:</i>	113
<i>Proposing the quality management model</i>	115
Summary	119
Limitations and Future Research	120
REFERENCES	121
INDEX	129

LIST OF TABLES

Table 1 Changing View of Quality (Harold 2001)	9
Table 2: Contrasting management paradigms (Mohanty and Sethi 1996)	23
Table 3: Differences between the QA, QC and TQM	26
Table 4: TQM implementation situations depending on sizes (Ghobadian and Gallear 1997)	42
Table 5: Comparison of different quality models (Gary 2004)	53
Table 6: Hypotheses	66
Table 7: Questionnaire structure and relevant supporting reference	68
Table 8	72
Table 9	72
Table 10	73
Table 11	73
Table 12	74
Table 13	74
Table 14	74
Table 15	75
Table 16	76
Table 17	76
Table 18	77
Table 19	78
Table 20	78
Table 21	78
Table 22	78
Table 23	79
Table 24	79
Table 25	80
Table 26	80
Table 27	80
Table 28	81
Table 29	81
Table 30	81
Table 31	82
Table 32	82
Table 33	83
Table 34	83
Table 35	84
Table 36	84
Table 37	85
Table 38	86
Table 39	86
Table 40	87
Table 41	87
Table 42	87
Table 43	88
Table 44	88
Table 45	88
Table 46	89

Table 47	89
Table 48	89
Table 49	90
Table 50	92
Table 51	92
Table 52	93
Table 53	94
Table 54	95
Table 55	96
Table 56	97
Table 57	98
Table 58	101
Table 59	103
Table 60	104
Table 61	105
Table 62	106
Table 63	112
Table 64	113
Table 65	113

LIST OF FIGURES

Figure 1: Project management constraints	13
Figure 2: Tasks of QA and QC in quality systems (Battikha 2003).....	25
Figure 3: Three quality dimensions and positioning (Mosad and Torbjörn 2001).	30
Figure 4: Interpreting quality definitions (Mireille 2003)	31
Figure 5: The salient elements of continues improvement implementation (Ghobadian and Gallear 1997)	33
Figure 6: Deming's Flow Diagram (Spenser 1994)	40
Figure 7: Total, Conformance, and Non-conformance Costs per Line of Code (Slaughter et al., 1998, p. 71).....	46
Figure 8: Deming Circle.....	47
Figure 9: A framework for the implementation of TQM in SMEs (Deming, 1986; Ghobadian & Gallear, 1997, p. 158)	48
Figure 10: The Structure of the Capability Maturity Model (Mark et al. 1993).....	49
Figure 11: Coverage of ISO 9001, 9002, & 9003 Standards (Fallah 1993)	51
Figure 12: System approach to quality management (Battikha 2003)	52
Figure 13: Bridging the quality programme implementation chasm.....	61
Figure 14: Research theoretical framework.....	64
Figure 15.....	65
Figure 16: Variables of IT project product quality	65
Figure 17: Variables of IT project process quality.....	66
Figure 18: An example of the questionnaire Likert scales.....	68
Figure 19.....	115
Figure 20: TQM implementation and improvement model	116
Figure 21.....	117
Figure 22.....	117
Figure 23.....	118
Figure 24.....	118
Figure 25.....	119